STATE OF CALIFORNIA

AIR RESOURCES BOARD

AIR MONITORING QUALITY ASSURANCE

VOLUME V

AUDIT PROCEDURES
FOR
AIR QUALITY MONITORING

APPENDIX AH

SYSTEM AUDIT PROCEDURES
FOR
AMBIENT AIR MONITORING PROGRAMS

MONITORING AND LABORATORY DIVISION

AUGUST 2002

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SYSTEM AUDIT PROCEDURES
FOR
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MONITORING AND LABORATORY DIVISION

AUGUST 2002

AH.1.0 SYSTEM AUDIT PROCEDURES FOR SAMPLING AND ANALYSIS PROGRAMS

AH.1.0.1 INTRODUCTION - A system audit of an ambient air monitoring sampling program is an on-site review and inspection of field sites and laboratory operations to assess its compliance with established regulations governing the collection, analysis, validation, and reporting of sampling data. A system audit is normally conducted at the initiation of a new monitoring system and annually thereafter. A system audit includes an appraisal of the following program areas: network management, field and laboratory operations, data management and reporting, and quality assurance. On-site interviews should include a review of the data processing procedure from field acquisition through reporting into the information storage system (i.e., Laboratory Information Management System (LIMS), Aerometric Information Retrieval System (AIRS)).

The system audit is facilitated by the use of a questionnaire designed to provide information about specific portions of the overall program. This questionnaire can be used to provide a system audit of the whole program, or sections of it individually, to provide an audit on a portion of the program.

This procedure addresses the field and laboratory evaluations of a system and performance audit, including an evaluation of the field and laboratory standard operating procedures.

AH.1.0.2 PRELIMINARY ASSESSMENT AND SYSTEM AUDIT PLANNING - In performing a system audit, the auditor is seeking a complete and accurate picture of that district's current sampling operations. The auditor should perform the on-site inspections and interviews with key personnel, evaluate sampling sites and scrutinize the data processing procedures.

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SYSTEM AUDIT PROCEDURES FOR AIR MONITORING PROGRAMS

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AH.1.1 GUIDELINES FOR CONDUCTING SYSTEM AUDITS

A system audit should consist of three separate phases:
- Pre-audit activities
- On-site audit activities
- Post-audit activities

AH.1.1.1 PRE-AUDIT ACTIVITIES - At the beginning of each year, a tentative schedule for on-site system audits of the field sites and laboratories should be established. As part of this scheduling, the auditor should indicate any special requirements such as access to specific areas or observation of specific activities.

Approximately six weeks prior to the on-site audit, the auditor should arrange a tentative schedule for meetings with key personnel, as well as for inspection of selected ambient air quality measurement and analytical operations. The auditor should also inform the district that they will receive a questionnaire which is to be completed and returned to the auditor within one month. Once the completed questionnaire has been returned, it will be reviewed, and the auditor will prepare a checklist detailing specific points for discussion with district personnel. The auditor should contact the district and coordinate the on-site audit.

AH.1.1.2 ON-SITE AUDIT ACTIVITIES - The auditor should meet initially with the district's contact person or his/her designee to discuss the scope, duration, and activities involved with the audit. This would include whether performance audits will be conducted and of which instruments and/or systems. This should be followed by a meeting with key personnel identified from the completed questionnaire or indicated by the district. Key personnel to be interviewed during the audit are those individuals with the responsibilities for: field and laboratory operations, data management and reporting, and quality assurance/quality control (QA/QC). The checklist of detailed specific points may be discussed during these meetings.

Enough time and effort should be devoted to the system audit so the auditor has a clear understanding and complete documentation in the following areas:

1. Organization
   - organization, training, and background of key personnel
   - general information on status of air monitoring program, QA plan, and field and laboratory standard operating procedures (SOP)

2. Field Operations
   - conformance with regulations and QA/QC requirements

- type of analyzers and samplers and conformance to 40 CFR Parts 53/58 requirements
- field procedures, standards, documentation
- frequency of zero/span, calibration, precision
- corrective actions, repeat sampling runs
- standards certification, frequency, traceability
- spare parts, tools, records of repair
- training as required or necessary
- data acquisition and handling reliability

3. Laboratory Operations
   - operational practices for manual methods
   - analytical methods used
   - use of SOPs, blanks, duplicates, and calibrations
   - corrective actions, repeat sample analysis
   - documentation and traceability for standards
   - record keeping, chain-of-custody, logbooks
   - waste disposal, safety practices, adequacy of laboratory
   - data acquisition, data flow, data back-up, and validation

4. Data Management
   - data flow from field and laboratory to data processing
   - overview of data entry, automatic or manual
   - control check methods: if automatic, software and system
   - system backup and recovery capabilities
   - data screening, flagging, validation, correction (who may correct?)
   - type of reports and responsibility for final validation

5. QA/QC Programs
   - status and implementation of procedures
   - outside audits
   - internal audits such as document reviews or data processing
   - implementation of corrective action
   - frequency, levels, and results of precision checks by pollutant

6. Reporting
   - precision and accuracy summaries
   - internal reports to track performance and corrective actions
   - summary of air data reports as required, completeness and validity

In order to facilitate gaining a complete understanding of the sampling and analysis program, the auditor should conduct a random spot check of the district's documentation and obtain sample copies of the following:

- logs (daily calibration checks, maintenance, etc.)
- calibration reports (field and laboratory)
- quarterly QC report
- monthly QC report
- organizational chart

Once the on-site system audit is complete, the auditor should meet again with key personnel and with the district's contact person or designee to present preliminary findings and possible recommendations. The auditor should state the audit results and include an indication of the potential data quality impact. This is also an opportunity for the district to provide feedback.

The potential data quality impact is based upon specific criteria, some of which are requirements, and others, which are only recommendations to improve the quality of a program. Specific criteria which must be met are found in 40 CFR Parts 50, 53, and 58, and in the "Quality Assurance Handbook for Air Pollution Measurement Systems", Volume II.

AH.1.1.3 POST-AUDIT ACTIVITIES - The major post-audit activity is the preparation of the System and Performance Audit Report. The preparation of this audit report requires the auditor to compare the documented standard operating procedures with the observed accomplishments and deficiencies of the audit findings.

If the deficiencies are such that the regulations and/or requirements are not met, then Air Data Quality Action (AQDA) requests should be issued. The AQDAs should note the pollutant, appropriate time period, and reason for the issuance, as well as the time allowed for a response.

A preliminary draft System and Performance Audit Report is submitted to the audited agency, together with a letter requesting comments and thanking the personnel for their assistance, time, and cooperation.

If written comments or questions concerning the audit report are received, they should be reviewed for incorporation into a final draft report within 30 days of receipt of the written comments. If no written comments are received within 30 calendar days from report date, the report will be formally distributed without further changes.

The System and Performance Audit Report should include the following:

- executive summary
- conclusion
- recommendations
- system audit objectives
- organization
- laboratory facility and operations
- field operations
- data management
- quality assurance and quality control
- performance audit
- data quality
- follow-up

The audit results should include information on the staff and equipment, network size and siting criteria, data management system, quality assurance and quality control functions, and on AQDAs issued, if any, including resolution of such AQDAs.

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APPENDIX AH.1.2

SYSTEM AUDIT PROCEDURES FOR AMBIENT AIR MONITORING PROGRAMS

MONITORING AND LABORATORY DIVISION

AUGUST 2002

AH.1.2 CRITERIA FOR EVALUATION

AH.1.2.1 INTRODUCTION - A system audit is normally conducted in five steps. First, a questionnaire is sent to the district prior to the audit visit. The district should fill out the questionnaire as completely as possible and return it with sufficient documentation with the use of attachments. Second, the questionnaire is reviewed by the auditor to become familiar with the system operations and to determine any weaknesses and potential problem areas. Third, the on-site visit and interviews are scheduled. Fourth, a report with recommendations is prepared and discussed with the audited agency. Fifth, the auditor follows up with a performance audit to determine if the recommendations were implemented.

For the field audit, the auditor should interview the site operator. For the laboratory audit, the auditor should interview the laboratory manager, any person who has direct analytical responsibility for sampling analysis, personnel associated with data validation, analysis, and reporting, and the person identified by the laboratory manager, who has responsibility for quality assurance. The information gathered from these interviews should be complete and up-to-date. The interviews should also present an adequate picture of the current and proposed levels of implementation of all quality assurance activities, including internal quality control. An evaluation of the data handling and processing, field and laboratory operations and procedures, QA/QC, and analytical processes should be conducted at this time.

At the conclusion of the series of interviews and the evaluations, the auditor should inform the agency contact person of the audit results and discuss any potential data-impacting problems uncovered. At this time, the auditor also explains the reporting procedures and schedule.

AH.1.2.2 QUESTIONNAIRE - An overall system audit questionnaire is intended for use when a complete system audit is being conducted. This questionnaire covers field as well as laboratory operations. The overall system audit questionnaire should be completed by the person responsible for the overall program and should be returned to the auditor.

The questionnaire, includes several areas including: the reporting organization homogeneity, general operation, staffing, network design, network operation, data and record keeping, and quality assurance. This questionnaire is intended to cover the management and organizational activities of the program.

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SYSTEM AUDIT PROCEDURES FOR AMBIENT AIR MONITORING PROGRAMS

MONITORING AND LABORATORY DIVISION

AUGUST 2002

AH.2.0 AIR MONITORING SYSTEM AUDIT QUESTIONNAIRE

Agency _____

Address _____

Phone Number (___) _____

Questionnaire Completed _____
(Date) (By)

On-Site Visit
Date _____ Audit Team Members _____

Affiliation of Audit Team _____

LONG FORM QUESTIONNAIRE

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A. NETWORK MANAGEMENT

1. GENERAL

(a) Provide and organization chart clearly showing the agency's structure and its reporting organizations. (Attach sheet(s) as necessary.)

(b) What is the basis for the current structure of the agency's reporting organizations?

Field operations conducted by a common team of field operators?	Yes[ ] No[ ]
Common calibration facilities are used?	Yes[ ] No[ ]
Precision and accuracy checks performed by common staff?	Yes[ ] No[ ]
Data handling follows uniform procedures?	Yes[ ] No[ ]
Central data processing facilities used for all reporting?	Yes[ ] No[ ]
Traceability of all standards established by one central laboratory?	Yes[ ] No[ ]
A central analytical laboratory handles all manual method analyses?	Yes[ ] No[ ]
Agency has an approved QA plan on file?	Yes[ ] No[ ]

(c) Briefly describe any changes which will be made within the agency's monitoring program during the next calendar year (Attach sheets as necessary.)

(d) Complete the table below for each of the criteria pollutants monitored as part of you air monitoring network, or review and update the network survey available on the web.

	Number of Monitors							
	SO2	NO2	CO	O3	VOC	PM10	PM2.5	PB
NAMS	____	____	____	____	____	____	____	____
SLAMS	____	____	____	____	____	____	____	____
SPM	____	____	____	____	____	____	____	____
TOTAL	____	____	____	____	____	____	____	____

A. NETWORK MANAGEMENT (Cont.)

(e) What is the date of the most recent official SLAMS network description? _____

i. Where is it available for public inspection? _____

ii. Does it include for each site the following?

AIRS Site ID#	Yes[ ] No[ ]
Location	Yes[ ] No[ ]
Sampling and Analysis Method	Yes[ ] No[ ]
Operating Schedule	Yes[ ] No[ ]
Monitoring Objective and Scale of Representativeness	Yes[ ] No[ ]
Any Proposed Changes	Yes[ ] No[ ]

(f) For each of the criteria pollutants, how many modifications (SLAMS including NAMS) have been made since the last systems audit? (List the total SLAMS and NAMS)

	Number of Monitors		
Pollutant	Added	Deleted	Relocated
Sulfur Dioxide	_____	_____	_____
Nitrogen Dioxide	_____	_____	_____
Carbon Monoxide	_____	_____	_____
Ozone	_____	_____	_____
VOC	_____	_____	_____
PM10	_____	_____	_____
PM2.5	_____	_____	_____
Lead	_____	_____	_____

(g) Briefly discuss any changes to the Air Monitoring Network planned for the next audit period. (Discuss equipment needs in Section B.3.g)

(h) Does an overall SLAMS/NAMS/PAMS Monitoring Plan exist? Yes[ ] No[ ]

A. NETWORK MANAGEMENT (Cont.)

(i) Has the agency prepared and implemented Standard Operating Procedures (SOP's) for all facets of air monitoring? Yes[ ] No[ ]

If no, list the subject of any missing SOP's.

(j) Do the Standard Operating Procedures adequately address at least the 14-item quality assurance requirements of Appendix A of the U.S. EPA's 40 CFR 58? Yes[ ] No[ ]

(k) Clearly identify by section number and/or document title, major changes made to documents since the last on-site review.

Title/Section #	Pollutant(s) Affected
_____	_____
_____	_____
_____	_____
_____	_____

(l) Does the agency have an implemented plan for operations during emergency episodes? Yes[ ] No[ ]

Please indicate the latest revision, approval date and current location of this plan.

Document Title: _____

Revision Date: _____ Approved: _____

(m) During episodes, are communications sufficient so that regulatory actions are based on real time data? Yes[ ] No[ ]

(n) Identify the section of the emergency episode plan where quality control procedures can be found.

_____

_____

_____

A. NETWORK MANAGEMENT (Cont.)

2. NETWORK DESIGN AND SITING

(a) Indicate by AIRS Number any non-conformance with the requirements of 40 CFR 58, Appendices D and E.

Monitor	Site ID (AIRS #)	Reason for Non-Conformance
SO2		
O3		
CO		
NO2		
VOC		
PM10		
PM2.5		
Lead		

(b) Please provide the following information on your previous Network Review required by 40 CFR 58.20d.

Review performed on: _____

Performed by: _____

Location and Title of Review Document: _____

_____

_____

A. NETWORK MANAGEMENT (Cont.)

Briefly discuss all problems uncovered by this review.

Have NAMS Hard Copy Information Reports (NHCIRs) been prepared for all monitoring sites within the network? Yes[ ] No[ ]

Does each site have the required information including:

AIRS identification number? Yes[ ] No[ ]

Photographs/slides to the four cardinal compass points? Yes[ ] No[ ]

Documentation of instrumentation? Yes[ ] No[ ]

Reasons for periods of missing data? Yes[ ] No[ ]

(e) Who has custody of the current network documentation?

_____

(Name) *(Title)*

(f) Does the current level of monitoring effort, site placement, instrumentation, etc., meet requirements imposed by current grant conditions? Yes[ ] No[ ]

If no, please explain briefly.

(g) How often is the network design and siting reviewed? _____

Date of last review: _____

(h) Please provide a summary of the monitoring activities conducted as the SLAMS/NAMS network by the agency as follows:

A. NETWORK MANAGEMENT (Cont.)

l. Monitoring is seasonal for (indicate pollutant and month of high and low concentrations).

Pollutant	High Concentration	Low Concentration	Collocated
_____	_____	_____	Yes[ ] No[ ]
_____	_____	_____	Yes[ ] No[ ]
_____	_____	_____	Yes[ ] No[ ]
_____	_____	_____	Yes[ ] No[ ]
_____	_____	_____	Yes[ ] No[ ]
_____	_____	_____	Yes[ ] No[ ]

ll. Monitoring is year-round for (indicate pollutant)

Pollutant	Collocated
_____	Yes[ ] No[ ]
_____	Yes[ ] No[ ]
_____	Yes[ ] No[ ]
_____	Yes[ ] No[ ]
_____	Yes[ ] No[ ]
_____	Yes[ ] No[ ]

(i) Does the number of collocated monitoring sites meet the requirements of 40 CFR 58 Appendix A? Yes[ ] No[ ]

If no, please explain briefly.

(k) Does the agency monitor and/or analyze for non-criteria air and/or toxic pollutants? Yes[ ] No[ ]

If yes, please complete the form below (attach additional sheets as required).

Pollutant	Monitoring Method/Instrument	SOP Available Yes[ ] No[ ]

A. NETWORK MANAGEMENT (Cont.)

3. ORGANIZATION, STAFFING AND TRAINING

(a) Please indicate the key individuals responsible for the following:

Agency Director _____

SLAMS Network Manager _____

Quality Assurance Officer _____

Field Operations Supervisor _____

Laboratory Supervisor _____

Data Management Supervisor _____

SLAMS Reporting Supervisor _____

(b) Please indicate the number of people available for each of the following program areas:

	Number	Comment or Need for Additional Personnel
Network Design and Siting		
Resources and Facilities		
Data and Data Management		
QA/QC		

(c) Does the agency have an established training program? Yes[ ] No[ ]

I. Where is this documented? _____

_____

(rev date)

II. Does it make use of seminars, courses, EPA sponsored college level courses? Yes[ ] No[ ]

A. NETWORK MANAGEMENT (Cont.)

lll. Indicate below the three most recent training events and identify the personnel participating in them.

Event	Dates	Participants
_____	_____	_____
		_____
		_____
		_____
_____	_____	_____
		_____
		_____
		_____
_____	_____	_____
		_____
		_____
		_____

(d) Does the agency subscribe to recognized publications? Please provide a list of periodicals. Are periodicals available to all personnel? Yes[ ] No[ ]

Periodical Title	Distribution
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

A. NETWORK MANAGEMENT (Cont.)

4. FACILITIES

(a) Identify the principal facility where the work is performed which is related to the SLAMS/NAMS network. Do not include monitoring sites but do include any work which is performed by contract or other arrangements.

Facility	Location	Main SLAMS/NAMS Function

(b) Please review the entries on the above table. Are there any areas of facilities that you believe should be upgraded? Please identify by location.

_____

_____

_____

(c) Are there any significant changes that are likely to be implemented to agency facilities before the next systems audit? Yes[ ] No[ ]

Please comment on your agency's needs for additional physical space (laboratory, office, storage, etc.)

Facility	Function	Proposed Change – Date

B. FIELD OPERATIONS

1. ROUTINE OPERATIONS

(a) Is the documentation of Monitoring SOP's complete? Yes[ ] No[ ]

Please complete the table below.

Pollutant Monitored	Date of Last Revision
Ozone	
CO	
NO2	
SO2	
VOC	
PM10	
PM2.5	
Lead	

Others (list by pollutants)

(b) Are such procedures available to all field operations personnel? Yes[ ] No[ ]

If not, briefly explain.

B. FIELD OPERATIONS (Cont.)

(c) Are standard operating procedures prepared and available to field personnel which detail operations during episode monitoring? Yes[ ] No[ ]

If not, briefly explain.

(d) Please complete the table below for each reporting section within your agency? (Attach separate sheets if necessary.)

Reporting Section	# of Sites	Pollutants
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

(e) On the average how often does a field operator visit most of your sites?

_____ per _____.

(f) Is this visit frequency consistent for all sections reporting within your agency? Yes[ ] No[ ]

If no, please document exceptions.

(g) On the average, how many sites does a single site operator have responsibility for? _____

B. FIELD OPERATIONS (Cont.)

(h) How many of the sites of your SLAMS/NAMS network are equipped with manifolds? _____

I. Briefly describe most common manifold type. _____

II. Are manifolds cleaned periodically? Yes[ ] No[ ]

If yes, how often? _____ per _____.

III. If the manifold is cleaned, what is used? _____

_____

_____

IV. Are manifolds equipped with a blower? Yes[ ] No[ ]

V. Is there sufficient air flow through the manifold at all times? Yes[ ] No[ ]

VI. Is there a conditioning period for the manifold after cleaning? Yes[ ] No[ ]

Briefly comment on the length of time the manifold is conditioned.

(i) What material is used for the instrument lines, and how often are the lines changed?

_____

_____

_____

_____

(j) Has the agency obtained necessary waiver provisions to operate equipment that does not meet the effective reference and equivalency requirements? Yes[ ] No[ ]

Comment on the agency's use of approved/non-approved instrumentation.

B. FIELD OPERATIONS (Cont.)

(k) Please complete the table below to indicate which analyzers do not conform to the requirements of 40 CFR 53 for NAMS, SLAMS, or SIP related SPM's.

Pollutant	Number	Make/Model	Site Identification	Comment On Variances
O3				
CO				
NO2				
SO2				
PM10				
PM2.5				

(l) Please comment briefly and prioritize your current identified instrument needs.

2. QUALITY CONTROL

(a) Are field calibration procedures included in the documented SOP's? Yes[ ] No[ ]
Comment on location (site, lab, office) of such procedures.

(b) Are calibrations performed in keeping with the guidance of U.S. EPA's Vol. II of the QA Handbook for Air Pollution Measurement Systems? Yes[ ] No[ ]

Please indicate the frequency of multi-point calibrations.

Reporting Section	Pollutant	Frequency

B. FIELD OPERATIONS (Cont.)

(c) Are calibrations performed to meet the minimum guidance offered in Section 2.0.9 Vol. II of the U.S. EPA's Quality Assurance Handbook for Air Pollution Measurement? Yes[ ] No[ ]
If no, please explain why not.

(d) Are calibration procedures consistent with the operational requirements of Appendices to 40 CFR 50 or to analyzer operation/instruction manuals? Yes[ ] No[ ]
If no, briefly explain any deviations.

(e) Have changes been made to calibration methods based on manufacturer's suggestions for a particular instrument? Yes[ ] No[ ]

If yes, are these changes documented? Yes[ ] No[ ]

(f) Do standard materials used for calibrations meet the requirements of Appendices to 40 CFR 50 and Appendix A to 40 CFR 58? Yes[ ] No[ ]

Please comment on any deviations.

(g) Are all flow-measurement devices checked and certified? Yes[ ] No[ ]
Please comment.

(h) What are the authoritative standards used for each type of flow measurement? Please list them in the table below, indicating the frequency of calibration standards to maintain field material/device credibility. (Attach additional sheets if necessary)

Flow Devices	Primary Standard	Frequency of Calibration
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

B. FIELD OPERATIONS (Cont.)

(i) Where do field operations personnel obtain gaseous standards?

_____

Are those standards certified by:

The agency laboratory?	Yes[ ] No[ ]
EPA/NERL standards laboratory?	Yes[ ] No[ ]
A separate laboratory from this agency but part of the same reporting organization?	Yes[ ] No[ ]
The vendor?	Yes[ ] No[ ]
NIST?	Yes[ ] No[ ]

(j) Does the documentation include the expiration date of certification? Yes[ ] No[ ]

Reference to primary standard used? Yes[ ] No[ ]

What traceability protocol is used? _____

_____

(k) Is calibration equipment maintained at each site? Yes[ ] No[ ]

If yes, for what pollutants? _____

_____

(l) How is the functional integrity of this equipment documented? _____

_____

(m) Please complete the table below for your agency's site standards (up to 7% of the sites, not to exceed 20 sites.)

Parameter	Primary Standard	Secondary Standard	Recertification Date
O3			
CO			
NO2			
SO2			

B. FIELD OPERATIONS (Cont.)

(n) Are level 1 zero and span (z/s) calibrations (or calibration checks) made for all continuous monitoring analyzers and flow checks made for all particulate samplers? Yes[ ] No[ ]

Please complete the table below:

	Pollutant	Span Conc. (ppm)	Frequency
I. Continuous Analyzers	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

	Flow Rate	Frequency
II. PM2.5 Samplers	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

	Flow Rate	Frequency
III. PM10 Samplers	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

B. FIELD OPERATIONS (Cont.)

(o) Does the agency have acceptance criteria for zero/span checks? Yes[ ] No[ ]
Please comment.

I. Are these criteria known to field operations personnel? Yes[ ] No[ ]

II. Are they documented in standard operating procedures? Yes[ ] No[ ]

If not, please indicate document and section where they can be found. _____

_____

III. Do the documents discussed in (II) above indicate when zero/span adjustments should and should not be made? Yes[ ] No[ ]

IV. Are zero and span check control charts maintained? Yes[ ] No[ ]

(p) In keeping with 40 CFR 58 regulations, are any necessary zero and span adjustments made after precision checks? Yes[ ] No[ ]

(q) Are precision check control charts maintained? Yes[ ] No[ ]

(r) Who has the responsibility for performing zero/span checks? _____

_____

(s) Are precision checks routinely performed within concentration ranges and with a frequency which meets or exceeds the requirements of 40 CFR 58, Appendix A? Yes[ ] No[ ]

(t) Please identify person(s) with the responsibility of precision checks on continuous analyzers.
Person(s)_____

Title_____

3. PREVENTIVE MAINTENANCE

(a) Has the field operator been given any special training in performing preventive maintenance? Yes[ ] No[ ]

Comment briefly on background or courses. _____

_____

_____

B. FIELD OPERATIONS (Cont.)

(b) Is the training routinely reinforced? Yes[ ] No[ ]

If no, please explain. _____

(c) If preventive maintenance is MINOR, it is performed at (check one or more):
Field Site[ ] Headquarters Facilities[ ] Equipment is Sent to Manufacturer[ ]

(d) If preventive maintenance is MAJOR, it is performed at (check one or more):
Field Site[ ] Headquarters Facilities[ ] Equipment is Sent to Manufacturer[ ]

(e) Does the agency have service contracts or agreements in place with instrument manufacturers? Yes[ ] No[ ]

If yes, indicate below or attach additional sheets to show which instrumentation is covered.

_____

_____

_____

(f) Comment briefly on the adequacy and availability or the supply of spare parts, tools and manuals available to the field operator to perform any necessary maintenance activities. Do you feel that this is adequate to prevent any significant data loss?

_____

_____

_____

(g) Is the agency currently experiencing any recurring problem with equipment or manufacturer(s)? Yes[ ] No[ ]

If yes, please identify the equipment and/or manufacturer, and comment on steps taken to remedy the problem.

_____

_____

_____

_____

_____

B. FIELD OPERATIONS (Cont.)

4. RECORD KEEPING

(a) Is a log book(s) maintained at each site to document site visits, preventive maintenance and resolution of site operational problems and corrective action taken? Yes[ ] No[ ]

Other uses. _____

(b) Is the logbook maintained currently and reviewed periodically? Yes[ ] No[ ]

Frequency of review. _____

(c) Once entries are made and all pages filled, is the logbook sent to the laboratory for archiving? Yes[ ] No[ ]

If no, where is it stored? _____

_____

(d) What other records are maintained?

Zero/span record? Yes[ ] No[ ]

Gas usage log? Yes[ ] No[ ]

Maintenance Log? Yes[ ] No[ ]

Precision check log? Yes[ ] No[ ]

Control charts? Yes[ ] No[ ]

Audit records? Yes[ ] No[ ]

Please describe the use and storage of these documents.

_____

_____

_____

_____

B. FIELD OPERATIONS (Cont.)

(e) Are calibration records available to field operators? Yes[ ] No[ ]

Please attach an example field calibration sheet to this questionnaire.

5. DATA ACQUISITION AND HANDLING

(a) With the exception of particulate matter, how are instrument outputs (data) recorded?
Stripcharts[ ] Telemetry[ ] Data Loggers[ ] Other[ ](specify) _____

Briefly explain. _____

_____

(b) Are there separate data reporting sections within your reporting agency? Yes[ ] No[ ]

If yes, please attach a separate sheet of paper outlining the reporting section, the pollutants reported, and the media used for data acquisition.

(c) Is there stripchart backup for all continuous analyzers? Yes[ ] No[ ]

(d) Where is the flow of high volume-samplers recorded at the site?
Log sheet[ ] Dixon chart[ ] Data Logger[ ] Other[ ](specify) _____

For samplers with flow controllers?
Log sheet[ ] Dixon chart[ ] Data Logger[ ] Other[ ](specify) _____

On High-volume samplers without flow controllers?
Log sheet[ ] Dixon chart[ ] Data Logger[ ] Other[ ](specify) _____

(e) What kinds of recovery capabilities for data acquisition equipment are available to the field operator after power outages, storms, etc? Briefly describe below.

_____

_____

_____

(e) Using a summary flow diagram, indicate all data handling steps performed at the air-monitoring site. Clearly indicate the format, frequency and contents of data submittals to the data processing section. Clearly indicate points at which flow path differs for different criteria pollutants. Be sure to include all calibration, zero/span and precision check data flow paths. How is the integrity of the data handling system verified?

C. LABORATORY OPERATIONS

1. ROUTINE OPERATIONS

(a) What analytical methods are employed in support of your air-monitoring network?

Analysis	Methods
PM10	
PM2.5	
SO4	
NO3	
Pb	
Others (list by pollutant)	

(b) Are bubblers used for any criteria pollutants? Yes[ ] No[ ]

If yes, attach a table that indicates the number of sites where bubblers are used, and the pollutant(s).

(c) Do any laboratory procedures deviate from the reference, equivalent, or approved methods? Yes[ ] No[ ]
- If yes, are the deviations for Pb analysis? Yes[ ] No[ ]
- PM10 filter conditioning? Yes[ ] No[ ]
- PM2.5 filter conditioning? Yes[ ] No[ ]
- Other? Yes[ ] No[ ]

If yes, please specify _____

_____

(d) Has EPA approved the procedures and/or any changes? Yes[ ] No[ ]

Date of approval _____

C. LABORATORY OPERATIONS (Cont.)

(e) Is the documentation of Laboratory Standard Operating Procedures complete? Yes[ ] No[ ]

Please complete the table below.

Analysis	Methods
PM10	
PM2.5	
SO4	
NO3	
Pb	
Others (list by pollutant)	

(f) Is sufficient instrumentation available to conduct your laboratory analyses? Yes[ ] No[ ]
If no, please indicate your needs in the table below.

Instrument Needed	Analysis	New or Replacement	Year of Acquisition

C. LABORATORY OPERATIONS (Cont.)

2. QUALITY CONTROL

(a) Please complete the table below for your agency's laboratory standards.

Parameter	Primary Standard	Secondary Standard	Recertification Date
O3			
CO			
NO2			
SO2			
Weights			
Temperature			
Humidity			
Barometric Pressure			
Flow			
Lead			
Sulfate			
Nitrate			

C. LABORATORY OPERATIONS (Cont.)

(b) Are all chemicals and solutions clearly marked with an indicated shelf life? Yes[ ] No[ ]

(c) Are chemicals removed and properly disposed of when shelf life expires? Yes[ ] No[ ]

(d) Does the laboratory use only ACS chemicals? Yes[ ] No[ ]

(e) Comment on the traceability of chemicals used in the preparation of calibration standards.

_____

_____

(f) Does the laboratory participate in interlaboratory comparisons? Yes[ ] No[ ]

If yes, what is the date of the last comparison? _____

Where are the results filed? _____

(g) Does the laboratory:

Purchase standard solutions such as those for use with Pb or other AA analysis? Yes[ ] No[ ]
Make their own standard solutions? Yes[ ] No[ ]
If the laboratory staff routinely make their own standard solutions, are procedures for such available? Yes[ ] No[ ]

Where are the procedures located? _____

_____

(h) Are all calibration procedures documented? Yes[ ] No[ ]

Where? _____ _____
(title) (revision)

(i) Are at least one duplicate, one blank, and one standard or spike included within a given analytical batch? Yes[ ] No[ ]
Identify analyses for which this is routine operation.

_____

_____

(j) Briefly describe the laboratory's use of data derived from blank analyses.

_____

_____

_____

C. LABORATORY OPERATIONS (Cont.)

(k) Do criteria exist which determine acceptable/non-acceptable blank data? Yes[ ] No[ ]
Please complete the table below.

Pollutant	Blank Acceptance Criteria
SO2	_____
SO4	_____
NO2	_____
NO3	_____
PM2.5	_____
PM10	_____
Pb	_____
Other	_____

Is corrective action taken if blank data falls outside the acceptable limits? Yes[ ] No[ ]

If yes, briefly explain.

(l) How frequently and at what concentration ranges does the lab perform duplicate analysis? What constitutes acceptable agreement? Please complete the table below.

Pollutant	Acceptance Criteria
SO2	_____
SO4	_____
NO2	_____
NO3	_____
PM2.5	_____
PM10	_____
Pb	_____

Is corrective action taken if duplicate analyses are not in agreement? Yes[ ] No[ ]

If yes, briefly explain.

C. LABORATORY OPERATIONS (Cont.)

(m) How does the lab use data from spiked samples? Please indicate what may be considered acceptable percentage recovery by analysis. Please complete the table below.

Pollutant	% Recovery Acceptance Criteria
SO2	_____
NO2	_____
NO3	_____
SO4	_____
PM2.5	_____
PM10	_____
Pb	_____
Other	_____

Is corrective action taken when spiked sample analysis does not fall within acceptable percentage recovery limits? Yes[ ] No[ ]

If yes, briefly explain.

(n) Does the laboratory routinely include samples of reference material obtained from EPA with an analytical batch? Yes[ ] No[ ]

If yes, indicate frequency, level, and material used. _____

_____

(o) Are mid-standards included in analytical batches? Yes[ ] No[ ]

If yes, are such standards included as a QC check (span check) on analytical stability? Please indicate the frequency, level and compound used in the space provided below.

_____

_____

_____

_____

C. LABORATORY OPERATIONS (Cont.)

(p) Do criteria exist for "real time" quality control based on the results obtained for the mid-range standards discussed above? Yes[ ] No[ ]

If yes, briefly discuss them below or indicate the document in which they may be found.

(q) Are appropriate acceptance criteria documented for each type of analysis conducted? Yes[ ] No[ ]

Do the analysts working with respective instruments know them? Yes[ ] No[ ]

3. PREVENTIVE MAINTENANCE

(a) For laboratory equipment, who has the responsibility for major and/or minor preventive maintenance?

Person _____ Title_____

(b) Is most maintenance performed:

In the laboratory? Yes[ ] No[ ]
In the instrument repair facility? Yes[ ] No[ ]
At the manufacturer's facility? Yes[ ] No[ ]

(c) Is a maintenance log maintained for each major laboratory instrument? Yes[ ] No[ ]

Comment _____

(d) Are service contracts in place for the following analytical instruments?

Analytical Balance Yes[ ] No[ ]

Atomic Absorption Spectrometer Yes[ ] No[ ]

Ion Chromatograph Yes[ ] No[ ]

Automated Colorimeter Yes[ ] No[ ]

_____ Yes[ ] No[ ]

4. RECORD KEEPING

(a) Are all samples received by the laboratory logged in? Yes[ ] No[ ]

Are they assigned a unique laboratory sample number? Yes[ ] No[ ]

Are they routed to the appropriate analytical section? Yes[ ] No[ ]

(b) Are logbooks kept for all analytical laboratory instruments? Yes[ ] No[ ]

C. LABORATORY OPERATIONS (Cont.)

(c) Do these logbooks indicate:

Analytical batches processed? Yes[ ] No[ ]

Quality control data? Yes[ ] No[ ]

Calibration data? Yes[ ] No[ ]

Results of blanks, spikes, and duplicates? Yes[ ] No[ ]

Initials of analyst? Yes[ ] No[ ]

(d) Is there a logbook that indicates the checks made on weights? Yes[ ] No[ ]

Balances? Yes[ ] No[ ]

Thermometers? Yes[ ] No[ ]

Relative Humidity Sensors? Yes[ ] No[ ]

(e) Are logbooks maintained to track the preparation of filters for the field? Yes[ ] No[ ]

Are they current? Yes[ ] No[ ]

Do they indicate proper conditioning? Yes[ ] No[ ]

Do they indicate proper weighings? Yes[ ] No[ ]

Do they indicate proper stamping and numbering? Yes[ ] No[ ]

(f) Are logbooks kept which track filters returning from the field for analysis? Yes[ ] No[ ]

(g) How are data records from the laboratory archived? _____

_____

Where are they archived? _____

Who has the responsibility? _____
Person Title

How long are they kept? _____

(h) Does a chain of custody procedure exist for laboratory samples? Yes[ ] No[ ]

(i) Has a chain of custody been documented and implemented as part of the laboratory standard operating procedures? Yes[ ] No[ ]

If yes, indicate date, title, revision number, and where it can be found. _____

_____

C: LABORATORY OPERATIONS (Cont.)

5. DATA ACQUISITION AND HANDLING

(a) Identify those laboratory instruments that make use of computer interfaces directly to record data. Which ones use stripcharts (or data loggers)? Which ones use integrators?

_____

_____

_____

_____

(b) Are QC data readily available to the analyst during a given analytical run? Yes[ ] No[ ]

(c) For most instruments that are computer interfaced, indicate which are backed up by stripcharts.

_____

_____

_____

(d) What is the laboratory's capability with regard to data recovery? In case of problems, can they recapture data or are they dependent on computer operations? Discuss briefly.

_____

_____

_____

(e) Has a user's manual been prepared for the automated data acquisition instrumentation? Yes[ ] No[ ]

Comment _____

_____

Is it in the analyst's or user's possession? Yes[ ] No[ ]

Is it current? Yes[ ] No[ ]

(f) Please provide below (or attach a separate sheet) a data flow diagram that establishes, by a short summary flow chart: transcriptions, validations, and reporting format changes the data goes through before being released to the data management group.

C. LABORATORY OPERATIONS (Cont.)

6. SPECIFIC POLLUTANTS: PM2.5, PM10, AND Pb

(a) Are the filters supplied by EPA used for the SLAMS sites? Yes[ ] No[ ]

Comment _____

_____

(b) Do filters meet the specifications in 40 CFR 50? Yes[ ] No[ ]

Comment _____

_____

(c) Are filters visually inspected using a strong light from a view box for pinholes and other imperfections? Yes[ ] No[ ]

If no, indicate how imperfections are determined _____

_____

(d) Are filters permanently marked with a serial number? Yes[ ] No[ ]

Indicate when and how this is accomplished. _____

_____

(e) Are exposed filters equilibrated in controlled conditioning environment which meets or exceeds the requirements of 40 CFR 50? Yes[ ] No[ ]

If no, why not? _____

_____

(f) Is the conditioning environment monitored? Yes[ ] No[ ]

Indicate monitoring frequency _____

(g) Are the monitors properly calibrated? Yes[ ] No[ ]

Indicate calibration frequency _____

(h) Is the balance checked with Class “S” weights each day of use? Yes[ ] No[ ]

If no, indicate frequency of checks. _____

Is the balance check information placed in the QC logbook? Yes[ ] No[ ]

If no, where is it recorded? _____

C. LABORATORY OPERATIONS (Cont.)

(j) Is the filter weighed to the nearest microgram/milligram? Yes[ ] No[ ]

If no, what mass increment? _____

(k) Are filter serial numbers and tare weights permanently recorded in a bound notebook? Yes[ ] No[ ]

If no, indicate where _____

(l) Are filters packaged for protection while transporting to and from sites? Yes[ ] No[ ]

If no, how are they transported? _____

(m) How often are filter samples collected? (Indicate average lapse time (hrs.) between end of sampling and laboratory receipt.)

_____

_____

(n) Are field measurements recorded in a logbook or on the filter folder? Yes[ ] No[ ]

If no, where are they recorded? _____

(o) Are exposed filters reconditioned for at least 24 hours in the same conditioning environment as for unexposed filters? Yes[ ] No[ ]

If no, why not? _____

_____

(p) Are exposed filters removed from folders, etc. before conditioning? Yes[ ] No[ ]

(q) Is the exposed filter weighed to the nearest microgram/milligram? Yes[ ] No[ ]

(r) Are exposed filters archived? Yes[ ] No[ ]

When? _____ Where? _____

Indicate retention period _____

_____

(s) Are blank filters reweighed? Yes[ ] No[ ]

If no, explain why not _____

_____

_____

C. LABORATORY OPERATIONS (Cont.)

(t) Are analyses performed on filters? Yes[ ] No[ ]
Indicate analyses other than lead and mass that are performed routinely.

_____

_____

_____

(u) Are sample weights and collection data recorded in a bound lab notebook? Yes[ ] No[ ]
On data forms? Yes[ ] No[ ]

(v) Are measured air volumes corrected to reference conditions as given in CFR regulations (Q_{std} of 760 mm Hg and 25°C) prior to calculating lead concentration. Yes[ ] No[ ]

If no, indicate conditions routinely employed for both internal and external reporting.

_____

_____

LEAD

(a) Is analysis for lead being conducted using atomic absorption spectrometry with air acetylene flame? Yes[ ] No[ ]

If no, have you received an equivalency designation of your procedure? Yes[ ] No[ ]

_____

_____

_____

(b) Is the hot acid or ultrasonic extraction procedure being followed precisely? Yes[ ] No[ ]

Which? _____

(c) Is Class A borosilicate glassware used throughout the analysis? Yes[ ] No[ ]

(d) Is all glassware scrupulously cleaned with detergent, soaked and rinsed three times with distilled-deionized water? Yes[ ] No[ ]

If no, briefly describe or attach your procedure _____

_____

_____

C. LABORATORY OPERATIONS (Cont.)

(e) If extracted samples are stored, are linear polyethylene bottles used? Yes[ ] No[ ]

Please comment _____

_____

(f) Are all batches of glass fiber filters tested for background lead content? Yes[ ] No[ ]

At a rate of 20 to 30 random filters per batch of 500 or greater? Yes[ ] No[ ]

If no, indicate rate of testing _____

(g) Are ACS reagent grade HNO3 and HCL used in the analysis? Yes[ ] No[ ]

If no, indicate grade used _____

(h) Is a calibration curve available having concentrations that cover the linear absorption range of the atomic absorption instrumentation? Yes[ ] No[ ]

Briefly describe _____

_____

(i) Is the stability of the calibration curve checked by alternately remeasuring every tenth sample at concentrations ≤1 µg Pb/ml and ≤10 µg Pb/ml? Yes[ ] No[ ]

If no, indicate frequency _____

(j) Are measured air volumes corrected to reference conditions as given in CFR regulations (Q_{std} of 760 mm Hg and 25°C) prior to calculating the lead concentration? Yes[ ] No[ ]

If no, indicate conditions routinely employed for both internal and external reporting.

_____

_____

(k) In either the hot or ultrasonic extraction procedure, is there always a 30-min H_2O soaking period to allow HNO3 trapped in the filter to diffuse into the rinse water? Yes[ ] No[ ]

Comment _____

(l) Is a quality control program in effect that includes periodic quantification of (1) lead in ¾ " X 8" glass fiber filter strips containing 100-300 µg Pb/strip, and/or (2) a similar strip with 600-1000 µg strip, and (3) blank filter strips with zero Pb content to determine if the method, being used, has any bias? Yes[ ] No[ ]

C. LABORATORY PROCEDURES (Cont.)

Comment on Pb QC program or attach applicable SOP. _____

_____

_____

_____

_____

(m) Are blank Pb values subtracted from Pb samples assayed? Yes[ ] No[ ]

If no, please explain. _____

_____

_____

_____

_____

D. DATA AND DATA MANAGEMENT

1. DATA HANDLING

(a) Is there a procedure, description, or a chart that shows a complete data sequence from point of acquisition to point of submission of data to EPA? Yes[ ] No[ ]

Please provide a data flow diagram (attach a separate sheet) indicating both the data flow within your agency and the data received from various local agencies.

(b) Are data handling and data reduction procedures documented?

For data from continuous analyzers? Yes[ ] No[ ]

For data from non-continuous analyzers? Yes[ ] No[ ]

(c) In what format and medium are data submitted to the data processing section? Please provide separate entry for each section within your agency.

Reporting Section	Data Medium	Format
_____	_____	_____
_____	_____	_____
_____	_____	_____

(d) How often are data received at the processing center from the field sites and laboratory?

At least: Once a week[ ] Every 1 - 2 weeks[ ] Once a month[ ]

(e) Is there documentation accompanying the data regarding any media changes, transcriptions, and/or flags that have been placed into the data before data are released to the agency internal data processing? Describe.

_____

_____

_____

_____

(f) How are the data actually entered to the computer system?

Digitization of stripcharts[ ] Manual/computerized transcriptions[ ] Other[ ]

Briefly explain. _____

_____

_____

D. DATA AND DATA MANAGEMENT (Cont.)

(g) Is a double-key entry system used for data at the processing center? Yes[ ] No[ ]

Are duplicate card decks prepared? Yes[ ] No[ ]

If no, why not? _____

_____

(h) Have special data handling procedures been adopted for air pollution episodes? Yes[ ] No[ ]

If yes, provide a brief description. _____

_____

_____

_____

2. SOFTWARE DOCUMENTATION

(a) Does the agency have an available copy of the Aerometric Information Retrieval System (AIRS) manual? Yes[ ] No[ ]

(b) Does the agency have the Precision and Accuracy Reporting System user's guide available? Yes[ ] No[ ]

(c) Does the Data Management Section have complete software documentation? Yes[ ] No[ ]

If yes, indicate the implementation date and latest revision dates for such documentation.

_____

_____

_____

(d) Do the documentation standards follow guidance offered by the EPA Software Documentation Protocols? Yes[ ] No[ ]

If no, what protocols are they based on? _____

_____

_____

D. DATA AND DATA MANAGEMENT (Cont.)

(e) What is the origin of the software used to process air monitoring data prior to its release into the AIRS database?

I. Purchased? Yes[ ] No[ ]

Supplier: _____

Date of latest version? _____

II. Written in-house? Yes[ ] No[ ]

Latest version _____ Date _____

III. Purchased with modifications in-house? Yes[ ] No[ ]

Latest version _____

IV. Other (please specify) _____

(f) Is a user's manual available to data management personnel for all software currently in use at the agency for processing SLAMS/NAMS data? Yes[ ] No[ ]

Please comment _____

_____

_____

(g) Is there a functional description in the users manual? Yes[ ] No[ ]

Is it separate from the manual but available to the user's? Yes[ ] No[ ]

(h) Are the computer system contents, including ambient air monitoring data backed up regularly? Yes[ ] No[ ]

Briefly describe, indicating at least the media, frequency, and back-up media storage location.

_____

_____

_____

(i) What is the recovery capability (how much time and data would be lost) in the event of a significant computer problem?

_____

_____

_____

D. DATA AND DATA MANAGEMENT (Cont.)

(j) Are test data available to evaluate the integrity of the software? Yes[ ] No[ ]

Is it properly documented? Yes[ ] No[ ]

3. DATA VALIDATION AND CORRECTION

(a) Have validation criteria, applicable to all pollutant data processed by the reporting agency been established and documented? Yes[ ] No[ ]

If yes, indicate the document where such criteria can be found (title, revision date)

_____

_____

_____

(b) Does documentation exist on the identification and applicability of flags (i.e., identification of suspect values) within the data as recorded with the data in the computer files? Yes[ ] No[ ]

(c) Do documented data validation criteria employed address limits on and for the following:

I. Operational parameters, such as flow rate measurements or flow rate changes? Yes[ ] No[ ]

II. Calibration raw data, calibration validation and calibration equipment tests? Yes[ ] No[ ]

III. All special checks unique to a measurement system? Yes[ ] No[ ]

IV. Tests for outliers in routine data as part of screening process? Yes[ ] No[ ]

V. Manual checks such as hand calculation of concentrations and their comparison with computer-calculated data? Yes[ ] No[ ]

(d) Are changes to data submitted to AIRS documented in a permanent file? Yes[ ] No[ ]

In no, why not? _____

_____

_____

(e) Are changes performed according to a documented SOP or your Agency Quality Assurance Project Plan? Yes[ ] No[ ]

If not, according to the QA Project Plan, please attach a copy of your current SOP.

D. DATA AND DATA MANAGEMENT (Cont.)

(f) Who has signature authority for approving corrections?

_____

(*Name*) (*Program Function*)

(g) Are data validation summaries prepared at each critical point in the measurement process of information flow and forwarded with the applicable block of data to the next level of validation? Yes[ ] No[ ]

Please indicate the point where such summaries are performed. _____

_____

_____

_____

(h) What criteria are applied for data to be deleted? Discuss briefly.

_____

_____

_____

_____

(i) What criteria are applied to cause data to be reprocessed? Discuss briefly.

_____

_____

_____

_____

(j) Is the group supplying data provided an opportunity to review the data and correct erroneous entries? Yes[ ] No[ ]

If yes, how? _____

_____

_____

(k) Are <u>corrected</u> data resubmitted to the issuing group for cross-checking prior to release? Yes[ ] No[ ]

4. DATA PROCESSING

(a) Does the agency generate data summary reports? Yes[ ] No[ ]

Are the data used for in-house distribution and use? Yes[ ] No[ ]

Publication? Yes[ ] No[ ]

Other (specify) _____

_____

(b) Please list at least three reports routinely generated.

Report Title	Distribution	Period Covered
_____	_____	_____
_____	_____	_____
_____	_____	_____

(c) Have special procedures been instituted for pollution index reporting? Yes[ ] No[ ]

If yes, briefly describe. _____

_____

_____

_____

(d) Who at the agency has the responsibility for submitting data to AIRS?

_____
(*Name*) (*Title*)

Is the data reviewed and approved by an officer of the agency prior to submittal? Yes[ ] No[ ]

_____
(*Name*) (*Title*)

(e) Are those persons different from the individuals who submit data to PARS? Yes[ ] No[ ]

If yes, provide name and title of individual responsible for PARS data submittal.

_____
(*Name*) (*Title*)

Data review and approval _____
(*Name*) (*Title*)

D. DATA AND DATA MANAGEMENT (Cont.)

(f) How often are data submitted to:

AIRS? _____

(g) How and/or in what form are data submitted?

TO AIRS? _____

(h) Are the recommendations and requirements for data coding and submittal, in the AIRS User's Manual, followed closely? Yes[ ] No[ ]

Comment on any routing deviations in coding procedures. _____

_____

_____

_____

(i) Are the recommendations and requirements for data coding and submittal, in the AIRS User's Guide, followed closely? Yes[ ] No[ ]

Comment on any routine deviations in coding and/or computational procedures.

_____

_____

_____

(j) Does the agency routinely request a hard copy printback of submitted data from AIRS? Yes[ ] No[ ]

(k) Are records kept for at least 3 years by the agency in accessible form? Yes[ ] No[ ]

If yes, does this include:

Raw Data? Yes[ ] No[ ]

Calculations? Yes[ ] No[ ]

QC Data? Yes[ ] No[ ]

QC Reports? Yes[ ] No[ ]

If no, please comment _____

_____

_____

_____

D. DATA AND DATA MANAGEMENT (Cont.)

(l) In what format are data received at the data processing center? (Specify pollutant)

Concentration Units	Yes[ ] No[ ]
Percent (%) Chart	Yes[ ] No[ ]
Voltages	Yes[ ] No[ ]
Other	Yes[ ] No[ ]

(m) Do field data include the following documentation?

Site Identification?	Yes[ ] No[ ]
Pollutant type?	Yes[ ] No[ ]
Date received at the data processing center?	Yes[ ] No[ ]
Collection data (flow, time, date)?	Yes[ ] No[ ]
Date of laboratory analysis (if applicable)?	Yes[ ] No[ ]
Operator/Analyst?	Yes[ ] No[ ]

(n) Are the appropriate calibration equations submitted with the data? Yes[ ] No[ ]

If not, explain why? _____

_____

_____

_____

(o) Provide a brief description of the procedures and appropriate formulae used to convert field data to concentrations prior to input into the data bank.

O3 _____

_____

CO _____

_____

NO2 _____

_____

SO2 _____

_____

D. DATA AND DATA MANAGEMENT (Cont.)

PM2.5 _____

_____

PM10 _____

_____

Lead _____

_____

CH4/THC _____

_____

Other _____

_____

(p) Are all concentrations corrected to EPA standard (298°K, 760 mm Hg) temperature and pressure condition before input to AIRS? Yes[ ] No[ ]

If no, specify conditions used. _____

(q) Are data reduction audits performed on a routine basis? Yes[ ] No[ ]

At what frequency? _____

Are they conducted by an independent group? Yes[ ] No[ ]

If yes, what group? _____

(r) Are there special procedures available for handling and processing precision, accuracy, calibrations, and span checks? Yes[ ] No[ ]

If no, please comment. _____

_____

If yes, provide a brief description:

Span check data _____

Calibration Data _____

Precision Data _____

Accuracy Data _____

D. DATA AND DATA MANAGEMENT (Cont.)

(s) Are precision and accuracy data checked each time they are recorded, calculated, or transcribed to ensure that incorrect values are not submitted to EPA? Yes[ ] No[ ]

Please comment and/or provide a brief description of checks performed. _____

_____

(t) Is a final processing check performed prior to submission of any data? Yes[ ] No[ ]

If yes, document briefly _____

_____

If no, please explain _____

_____

5. INTERNAL REPORTING

(a) What reports are prepared and submitted as a result of the audits required under 40 CFR Appendix A?

Report Title	Frequency
_____	_____
_____	_____

(Please include an example audit report and, by attaching a coversheet, identify the distribution such reports are given within the agency.)

(b) What internal reports are prepared and submitted as a result of precision checks required under 40 CFR 58, Appendix A?

Report Title	Frequency
_____	_____
_____	_____

(Please include an example of a precision check report and, identify the distribution of such reports within the agency.)

(c) Do either the audits or precision reports indicated include a discussion of corrective actions initiated based on audit or precision results? Yes[ ] No[ ]

If yes, identify reports and section numbers _____

_____

D. DATA AND DATA MANAGEMENT (Cont.)

(d) Does the agency prepare Precision and Accuracy summaries? Yes[ ] No[ ]

If yes, please attach a copy of the most recent report.

(e) Who has the responsibility for the calculation and preparation of data summaries? To whom are such Precision and Accuracy summaries delivered?

Name	Title	Type of Report	Recipient
_____	_____	_____	_____
_____	_____	_____	_____

(f) Identify the individual within the agency who receives the results of the agency's participation in the NPAP and the internal distribution of the results once received?

Name _____ Title _____

Distribution is _____

_____

_____

(*Name*) (*Title*)

6. EXTERNAL REPORTING

(a) For the current calendar year or portion thereof which ended at least 90 calendar days prior to the receipt of this questionnaire, please provide the following percentages for required data submitted.

% Submitted on Time*

Monitoring Quarter	O3	CO	NO2	SO2	PM10	PM2.5	Pb
1 (Jan.1 – Mar.31)							
2 (Apr.1 – Jun.30)							
3 (Jul.1 – Sep.30)							
4 (Oct.1 – Dec.31)							

*"On Time" = within 90 calendar days after the end of the quarter in which the data were collected.

D. DATA AND DATA MANAGEMENT (Cont.)

(b) Identify the individual within the agency with the responsibility for preparing the required 40 CFR 58, Appendix F and G reporting inputs?

Name _____ Title _____

(c) Identify the individual within the agency with the responsibility for reviewing and releasing the data.

Name _____ Title _____

(d) Does the agency regularly report the Pollutant Standard Index (PSI)? Yes[ ] No[ ]

Briefly describe the media, coverage, and frequency of such reporting.

_____

_____

_____

_____

_____

(e) What fraction of the SLAMS sites (by pollutant) reported less than 75% of the data (adjusted for seasonal monitoring and site start-ups and terminations)?

Fiscal Year _____

Pollutant	Percent of Sites < 75% Data Recovery 1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
O3				
CO				
NO2				
SO2				
PM2.5				

D. DATA AND DATA MANAGEMENT (Cont.)

PM10

Pb

(f) Does the agency's annual report (as required by 40 CFR 58.26) include the following?

Data summary required in Appendix F.	Yes[ ] No[ ]
Annual precision and accuracy information described in Section 5.2 of Appendix A.	Yes[ ] No[ ]
Location, data, pollution source and duration of all episodes reaching the significant harm levels.	Yes[ ] No[ ]
Certification by a senior officer in the State or his designee.	Yes[ ] No[ ]

(g) Please provide the dates at which the annual reports have been submitted for the last 2 years.

E. QUALITY ASSURANCE/QUALITY CONTROL

1. STATUS OF QUALITY ASSURANCE PROGRAM

(a) Does the agency have an EPA-approved quality assurance program plan? Yes[ ] No[ ]

If yes, have changes to the plan been approved by the EPA? Yes[ ] No[ ]

Date of Original Approval _____Date of Last Revision _____

Date of Last Approval _____

(b) Do you have any revisions to your QA Program Plan still pending? Yes[ ] No[ ]

(c) Is the QA Plan fully implemented? Yes[ ] No[ ]

Please comment briefly _____

_____

(d) Are copies of the QA Plan or pertinent sections available to agency personnel? Yes[ ] No[ ]

If no, why not? _____

_____

(e) Which individuals routinely receive updates to the QA Plan?

_____

_____

2. AUDITS AND AUDIT SYSTEM TRACEABILITY

(a) Does the agency maintain a separate audit/calibration support facility? Yes[ ] No[ ]

(b) Has the agency documented and implemented specific audit procedures? Yes[ ] No[ ]

(c) Have audit procedures been prepared in keeping with the requirements of 40 CFR 58, Appendix A? Yes[ ] No[ ]

If no, comment on any EPA approved deviations _____

_____

(d) Do the procedures meet the specific requirements for independent standards and the suggestions regarding personnel and equipment? Yes[ ] No[ ]

Comment _____

_____

E. QUALITY ASSURANCE/QUALITY CONTROL (Cont.)

(e) Are Standard Reference Materials (SRM) or Certified Reference Materials (CRM) used to routinely certify audit materials? Yes[ ] No[ ]

(f) Does the agency routinely use NIST-SRM or CRM materials? Yes[ ] No[ ]

For audits only. Yes[ ] No[ ]

For calibrations only. Yes[ ] No[ ]

For Both. Yes[ ] No[ ]

For neither, secondary standards are employed. Yes[ ] No[ ]

(g) Does the agency audit the meteorological sites? Yes[ ] No[ ]

(h) Please list below areas routinely covered by this review, the date of the last review, and changes made as a direct result of the review.

Pollutants	Audit Method	Audit Standard
O3		
CO		
NO2		
SO2		
PM2.5		
PM10		

(i) Are SRM's or CRM's used to establish traceability of calibration and zero/span check materials provided to field operations personnel? Yes[ ] No[ ]

(j) Specifically for gaseous standards, how is the traceability of audit system materials established. Are they:

Purchased certified by the vendor? Yes[ ] No[ ]

Certified by the QA support laboratory that is part of the agency? Yes[ ] No[ ]

E. QUALITY ASSURANCE/QUALITY CONTROL (Cont.)

(k) Are all traceability and standardization methods used documented? Yes[ ] No[ ]

Indicate document where such methods can be found _____

_____

(l) Do the traceability and standardization methods conform to the guidance of U.S EPA's Volume ll of the Handbook for Air Pollution Measurement Systems? Yes[ ] No[ ]

For permeation devices? Yes[ ] No[ ]

For cylinder gases? Yes[ ] No[ ]

(m) Does the agency have identifiable auditing equipment (specifically intended for sole use) for audits? Yes[ ] No[ ]

If yes, provide specific identification _____

_____

(n) How often is auditing equipment certified for accuracy against standards and equipment of higher authority?

_____

(o) As a result of the audit equipment checks performed, have pass/fail (acceptance criteria) been decided for this equipment? Yes[ ] No[ ]

Indicate what these criteria are with respect to each pollutant. Where are such criteria documented?

Pollutant	Criteria
_____	_____
_____	_____
_____	_____

3. NATIONAL PERFORMANCE AUDIT PROGRAM (NPAP) AND ADDITIONAL AUDITS

(a) Identify the individual with primary responsibility for the required participation in the NPAP?

For gaseous materials? Name _____

Title _____

For laboratory materials? Name _____

Title _____

E. QUALITY ASSURANCE/QUALITY CONTROL (Cont.)

(b) Does the agency currently have in place any contracts or agreements with another agency or outside contractor to perform any of the audits required by 40 CFR 58? Yes[ ] No[ ]

Please comment _____

_____

_____

If yes, has the agency included QA requirements with this agreement? Yes[ ] No[ ]

Is the agency adequately familiar with their QA program? Yes[ ] No[ ]

(c) Date last internal systems audit was conducted: _____

By whom? _____

(d) Please complete the table below.

Parameter Audited	Date of Last NPAP
Ozone	_____
Carbon Monoxide	_____
Nitrogen Dioxide	_____
Sulfur Dioxide	_____
PM10	_____
PM2.5	_____

(e) Does the agency participate in the National Performance Audit Program as required under 40 CFR 58, Appendix A? Yes[ ] No[ ]

If no, why not? _____

_____

_____

_____

_____

4. DOCUMENTATION AND DATA PROCESSING REVIEW

(a) Does the agency periodically review its record-keeping activities? Yes[ ] No[ ]

E. QUALITY ASSURANCE/QUALITY CONTROL (Cont.)

Please list below areas routinely covered by this review, the date of the last review, and changes made as a direct result of the review.

Area/Function	Date of Review	Changes	Discuss Changes
_____	_____	Yes[ ] No[ ]	_____
_____	_____	Yes[ ] No[ ]	_____
_____	_____	Yes[ ] No[ ]	_____

(b) Are data audits (specific re-reductions of strip charts or similar activities) routinely performed for criteria pollutant data reported by the agency? Yes[ ] No[ ]

If no, please explain. _____

_____

(c) Are procedures for such data audits documented? Yes[ ] No[ ]

(d) Are they consistent with the recommendations of Sections 16.4.2.3 of Volume II of the U.S. EPA's QA Handbook for Air Pollution Measurement Systems? Yes[ ] No[ ]

If no, why not? _____

_____

_____

(e) What is the frequency and level (as a percentage of data processed) of these audits?

Pollutant	Audit Frequency	Period of Data Audited	% of Data Rechecked
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

(f) Identify the criteria for acceptable/non-acceptable results from a data processing audit for each pollutant, as appropriate.

Pollutant	Acceptance Criteria	Data Concentration Level
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

E. QUALITY ASSURANCE/QUALITY CONTROL (Cont.)

(g) Are procedures documented and implemented for corrective actions based on results of data audits which fall outside the established limits? Yes[ ] No[ ]

If yes, where are such corrective actions procedures documented?

_____

_____

_____

5. CORRECTIVE ACTION SYSTEM

(a) Does the agency have a comprehensive Corrective Action program in place and operational? Yes[ ] No[ ]

(b) Have the procedures been documented? Yes[ ] No[ ]

Are they part of the agency QA Plan? Yes[ ] No[ ]

Is there a separate Standard Operating Procedure? Yes[ ] No[ ]

Briefly describe it or attach a copy. _____

_____

_____

_____

(c) How is responsibility for implementing corrective actions on the basis of audits, calibration problems, zero/span checks, etc. assigned? Discuss briefly.

_____

_____

_____

_____

(d) How does the agency follow up on implemented corrective actions? _____

_____

_____

_____

_____

E. QUALITY ASSURANCE/QUALITY CONTROL (Cont.)

(e) Briefly describe two (2) recent examples of the ways in which the above corrective action system was employed to remove a problem area with:

l. Audit Results: _____

_____

ll. Data Management: _____

_____

6. AUDIT RESULT ACCEPTANCE CRITERIA

(a) Has the agency established and has it documented criteria to define agency-acceptable audit results? Yes[ ] No[ ]

Please complete the table below with the pollutant, monitor and acceptance criteria.

Pollutant	Audit Result Acceptance Criteria
O3	
CO	
NO2	
SO2	
PM2.5	
PM10	

(b) Were these audit criteria based on, or derived from, the guidance found in U.S. EPA's Vol. ll QA Handbook for Air Pollution Measurement System Section 2.0.12? Yes[ ] No[ ]

If no, please explain _____

_____

E. QUALITY ASSURANCE/QUALITY CONTROL (Cont.)

If yes, please explain any changes or assumptions made in the derivation.

_____

_____

_____

_____

(c) What corrective action may be taken if criteria are exceeded? If possible, indicate two (2) examples of corrective actions within the period since the previous systems audit that are based directly on the criteria discussed above.

Corrective Action #1_____

_____

_____

_____

Corrective Action #2_____

_____

_____

_____

(d) As a goal, the 95 percent probability limits for precision (all pollutants) and PM10 accuracy should be less than ± 15%. At 95 percent probability limits, the accuracy for all other pollutants should be less than ± 20%. Using a short narrative and a summary table, compare the reporting organization's performance against the goals over the last year. Explain any deviations.

NOTE: Precision and accuracy are based on reporting organizations; therefore this question concerns the agencies that are the responsibility of each reporting organization.

(e) Do the precision and accuracy goals meet the 95 percent probability limits? Yes[ ] No[ ]

If no, and to the extent possible, describe problems preventing the meeting of precision and accuracy goals (Attach a separate sheet if necessary).

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AIR RESOURCES BOARD

AIR MONITORING QUALITY ASSURANCE

VOLUME V

AUDIT PROCEDURES
FOR
AIR QUALITY MONITORING

APPENDIX AH.3.0

SYSTEM AUDIT PROCEDURES
FOR
AMBIENT AIR MONITORING PROGRAMS

MONITORING AND LABORATORY DIVISION

AUGUST 2002

AH.3.0 FIELD OPERATIONS EVALUATION

AH.3.0.1 INTRODUCTION - A field operations system audit follows the procedures outlined in Section AH.1.2, Criteria for Evaluation. The system audit consists of 3 steps: 1) sending a questionnaire to the district prior to the audit visit, 2) reviewing the completed questionnaire, and 3) conducting the on-site visit and interviews. It may be necessary to visit one or more of the air monitoring sites. Therefore, it is highly recommended that arrangements be made in advance of the on-site visit.

During the on-site visit, the auditor should interview the site operator responsible for the samplers and or instruments, personnel associated with field data validation, analysis, and reporting, and the person identified who has responsibility for the quality assurance. The information gathered from these interviews should be accurate, and should present an adequate picture of the current and proposed levels of implementation of all quality assurance activities, including internal quality control. An evaluation of the data handling and processing, field operations and procedures, and QA/QC should be conducted at this time. This evaluation should consist of, at a minimum, a random verification of the agency's records.

At the conclusion of the series of interviews and evaluations, the auditor should inform the agency contact person of the audit results and discuss any potential data-impacting problems uncovered. At this time, the auditor also explains the reporting procedures and schedule.

AH.3.0.2 GENERAL GUIDANCE FOR SITE DOCUMENTATION - During the initial phase of network installation, each site should be documented using a site report form. This form should be completed by organization personnel to record station location, site classification, station instrumentation, topography, and important pollution sources (see ARB's Air Monitoring Quality Assurance Manual Volume II, Section 2.0.3). This documentation should be updated at least annually thereafter, to reflect the changes that occur at the sites (e.g., construction of a new building).

It is important that the information contained on such site documentation be verified as accurate. While it does not fall within the scope of the quality assurance function to prepare these site documents, the auditor should verify, for a small number of sites, that the information contained in such documents is accurate and complete. He/she should note any changes which may affect data quality and notify organization management of such problems. Of particular

importance in this regard are sites where collocated instrumentation has been placed; such data may be used to estimate measurement or data precision.

AH.3.0.3 SITE EVALUATION REPORTING - At the conclusion of a site evaluation or evaluation of a group of sites for a single organization, the auditor should prepare a brief written report (refer to Section AH.1.1.3). This report should indicate at least a discussion of observations made during the site visit as noted in the questionnaire and a copy of the site documentation used for the evaluation. Where major discrepancies are noted, additional information needs to be included. If further documentation has been provided by the auditor, a newly completed accurate site description document should be attached. Recommendations to improve siting should be included.

AH.3.0.4 QUESTIONNAIRE - A field operations questionnaire (if not part of the systems audit questionnaire) should be completed by every person involved in sample and data handling, operations of a field site, and field activities quality control. The completed questionnaire will provide information on site documentation and field site evaluation.

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AIR RESOURCES BOARD

AIR MONITORING QUALITY ASSURANCE

VOLUME V

AUDIT PROCEDURES FOR AIR QUALITY MONITORING

APPENDIX AH.4.0

SYSTEM AUDIT PROCEDURES FOR AMBIENT AIR MONITORING PROGRAMS

MONITORING AND LABORATORY DIVISION

AUGUST 2002

AH.4.0 LABORATORY OPERATIONS EVALUATION

AH.4.0.1 PROCEDURE - A laboratory system audit follows the procedures outlined in Section AH.1.2, Criteria for Evaluation. That is, the system audit is conducted in three steps: 1) a questionnaire is sent to the analytical laboratory prior to the audit visit, 2) the questionnaire is reviewed by the auditor, and 3) the on-site visit and interviews are scheduled.

During the on-site visit, the auditor should interview the laboratory manager, any person who has direct analytical responsibility for sampling analysis, personnel associated with data validation, analysis, reporting, and the person identified by the laboratory manager who has responsibility for quality assurance. The information gathered from these interviews, complete and up-to-date, should present an adequate picture of the current and proposed levels of implementation of all quality assurance activities, including internal quality control. An evaluation of the data handling and processing, laboratory operations and procedures, QA/QC, and analytical process should be conducted at this time.

At the conclusion of the series of interviews and evaluations, the auditor should inform the laboratory manager of the audit results and discuss any potential data impacting problems uncovered. At this time, the auditor also explains the reporting procedures and schedule.

AH.4.0.2 QUESTIONNAIRE - A laboratory questionnaire (if not part of the system audit questionnaire) provides information on analytical methods, standard laboratory operations, data entry, data bank validation, laboratory quality control, and laboratory management. The laboratory system audit questionnaire should be completed by every person involved in the data entry and review process, and by every person responsible for the operation of an analytical instrument.

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AIR MONITORING QUALITY ASSURANCE

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AUDIT PROCEDURES FOR AIR QUALITY MONITORING

APPENDIX AH.5.0

SYSTEM AUDIT PROCEDURES FOR AMBIENT AIR MONITORING PROGRAMS

MONITORING AND LABORATORY DIVISION

AUGUST 2002

AH.5.0 REFERENCES

1. 40 CFR 50, July 1996.

2. 40 CFR 53, July 1996.

3. 40 CFR 58, July 1996.

4. U.S. EPA "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II."

5. ARB "Air Monitoring Quality Assurance, Volume V".